

RAIL VISION

Public Meeting Presentation

OCTOBER 23, 2019



Purpose of Today's Meeting

1. Welcome
2. Review of Alternatives
3. Preliminary Findings
4. Summary of Alternatives 1-6
5. Next Steps
6. Public Comment

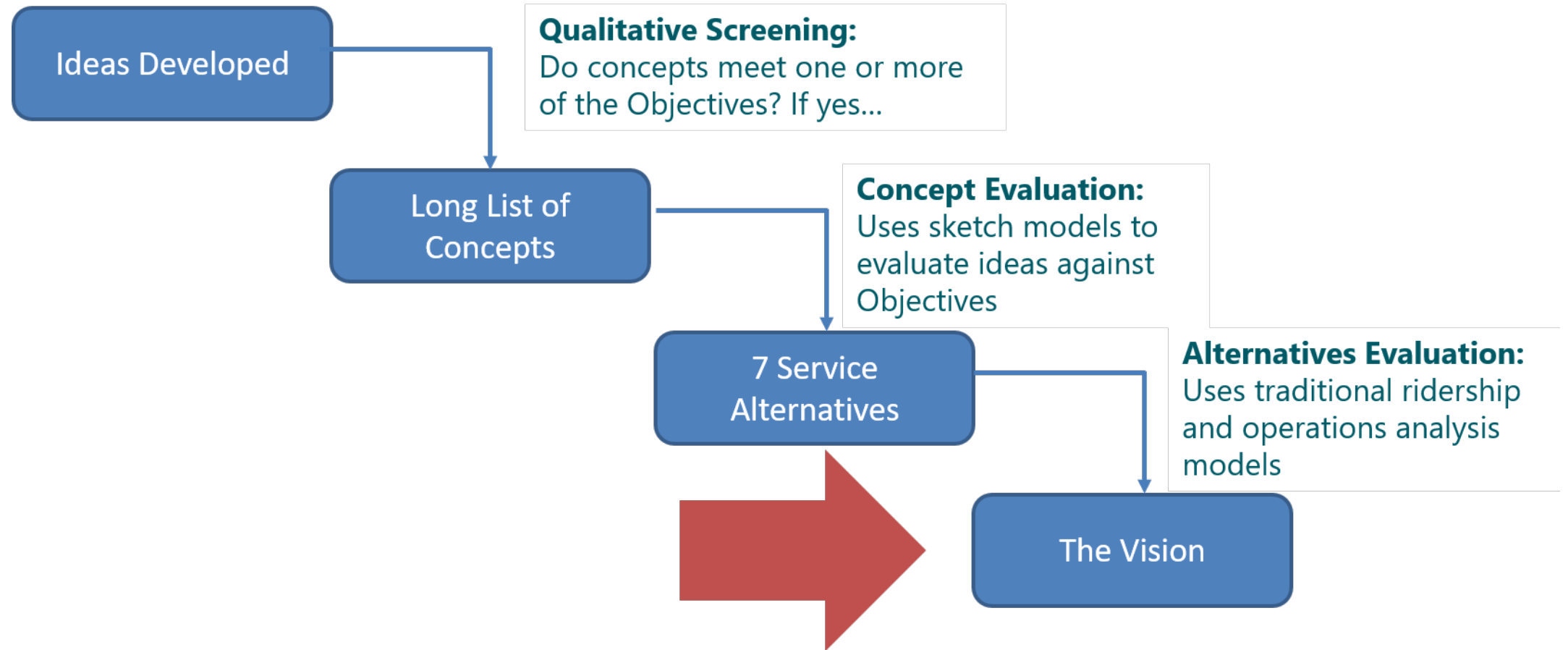
Project Goal

Leverage the MBTA's extensive commuter rail network to best meet the transportation and economic growth needs of the region.

Project Objectives

1. Match service with the growing and changing needs of the region
2. Enhance economic vitality
3. Improve the passenger experience
4. Provide an equitable and balanced suite of investments
5. Help the Commonwealth achieve its climate change resiliency targets
6. Maximize return on investment (financial stewardship)

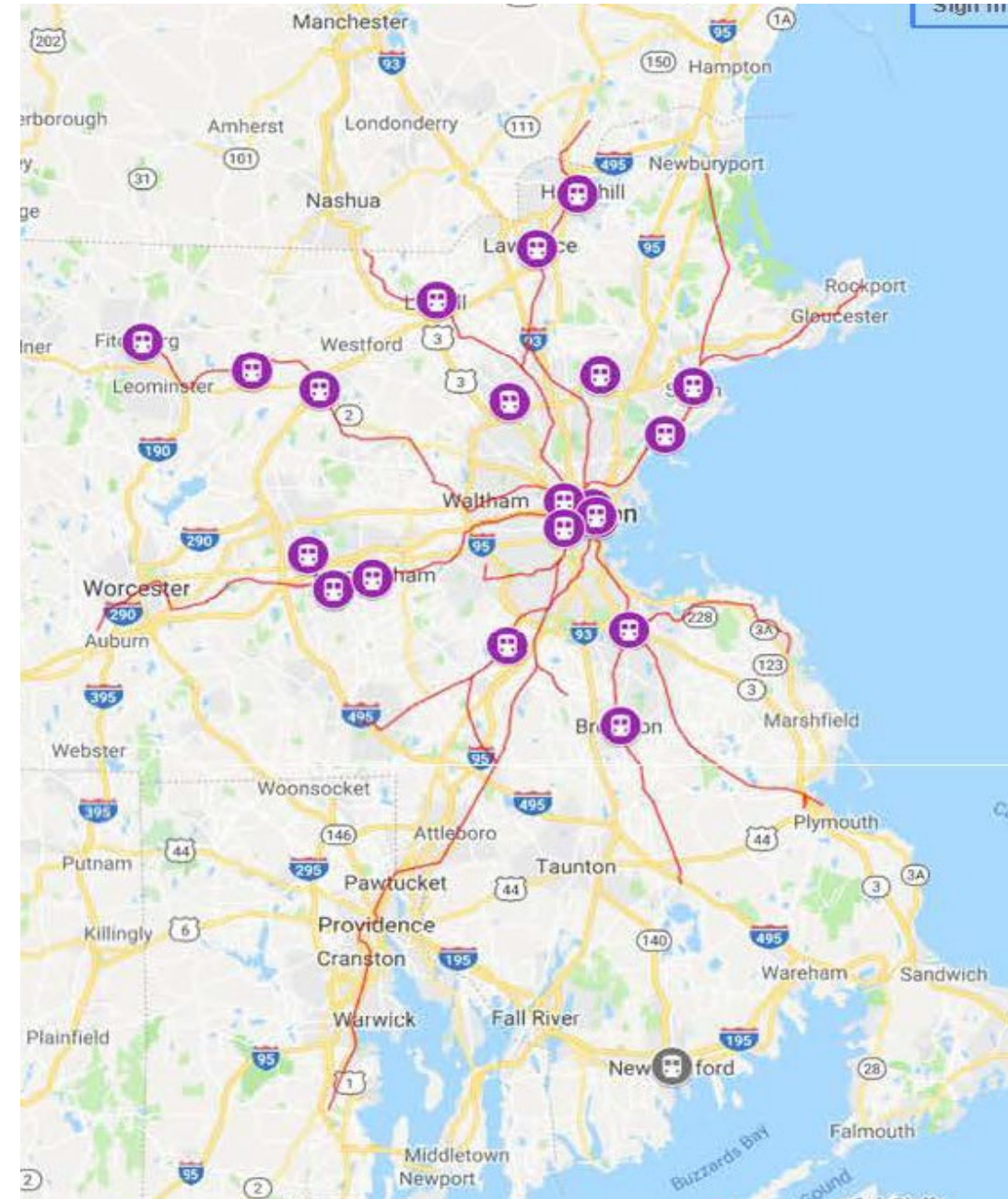
Where We Are Now



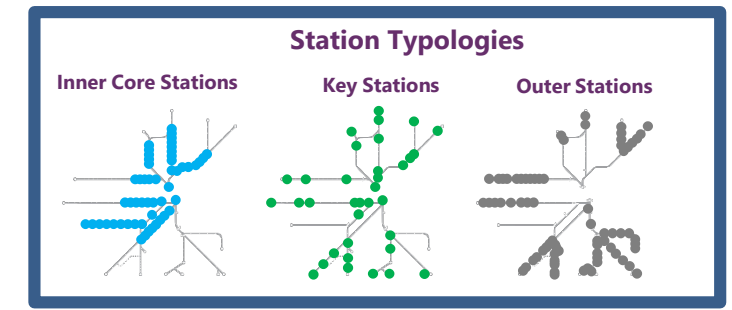
Stakeholder Engagement

- Peer Reviews
- Advisory Committee (7 meetings + optional)
- Public Meetings and Open House (3/5 + 10/23)
- State House/Legislative Briefing (2)
- Briefings/Meetings throughout the region (45, to date)
- Non-Rider Survey focused on trade-offs
 - nearly 3,000 responses

I would like the rail service to be:



Review of Alternatives



	1: Higher Frequency Commuter Rail	2: Regional Rail to Key Stations (Diesel)	3: Regional Rail to Key Stations (Electric)	4: Urban Rail (Diesel)	5: Urban Rail (Electric)	6: Full Transformation
Typical Frequency (Peak/Off-Peak)						
Key Stations	● 30/60	● 15/15 (North Side) ● 30/30 (South Side)	● 15/15	● 30/60	● 30/60	● 15/15
Inner Core	● 30/60	● 30/60	● 30/60	● 15/15	● 15/15	● 15/15
Outer Stations	● 30/60	● 30/60	● 30/60	● 30/60	● 30/60	● 15/15
Fully Accessible High-Level Platforms						
Key Stations	I	✓	✓	-	-	✓
Inner Core	Existing or Programmed Upgrades Only	-	-	✓	✓	✓
Outer Stations	I	-	-	-	-	✓
Parking Modeled as Unconstrained						
Most Key Stations	I	✓	✓	-	-	✓
Urban Rail Termini	Parking Modeled Fully Constrained	-	-	✓	✓	✓
Non-Rapid Transit Stations with >50 Spaces	I	-	-	-	-	✓
Electrification						
Major Expansions						

Evaluating relative benefits and costs across the alternatives will provide the foundation to build one or more Visions for the future of commuter rail, which may combine features from multiple alternatives to maximize the effectiveness of the MBTA rail network.

Preliminary Findings





2040 No-Build Outlook

Methodology – No-Build Demand (2040)

- Modeled using CTPS regional travel demand model for 2040 Future Year using MAPC projected land use
- Alternatives are compared to a 2040 No-Build Scenario
 - **No-Build is demand, not ridership. It does not constrain boardings to available seats, but does constrain to current parking supply** and assumes existing MBTA services and expansions from financially constrained plans (e.g., SCR Phase 1)
- Systemwide commuter rail demand increases in all alternatives
- Other modes are impacted by increased commuter rail service (diversions, connectivity), so demand increases by 12% (157,400 boardings)

General Findings – No-Build Demand (2040)

No-Build Results	Total 2040 No-Build Daily Boardings	Increase in Daily Boardings (2018 – 2040)	% Increase in Daily Boardings (2018 – 2040)	Findings on Growth
Commuter Rail	150,800	24,000	19%	Growth without Rail Vision in place by 2040
North Side	46,100	3,800	9%	Highest on Haverhill and Lowell Lines
South Side	104,700	20,200	24%	Highest on Old Colony Lines and SCR
Other Modes	1,500,500	157,400	12%	Highest on Rapid Transit and Silver Line



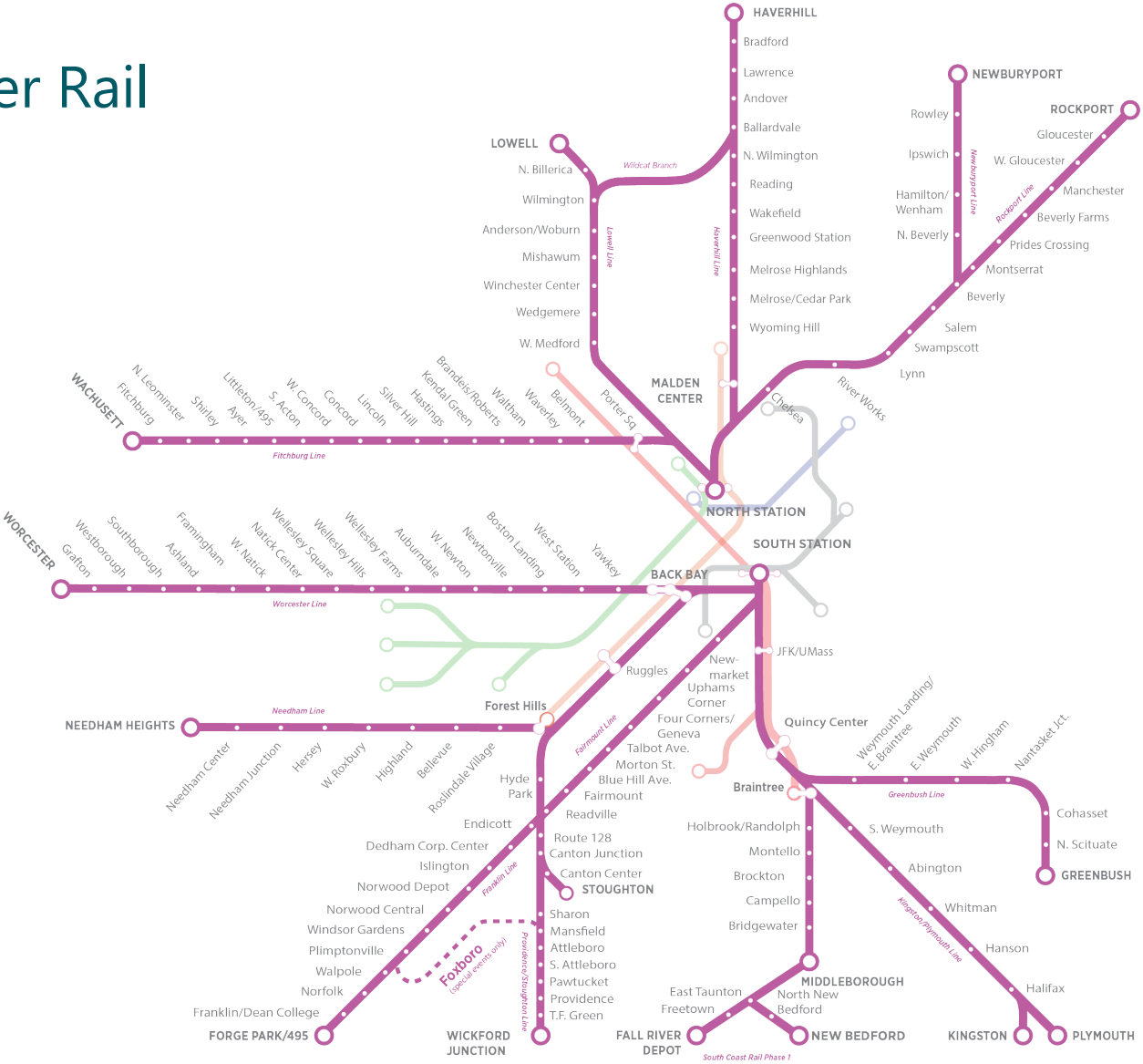
Preliminary Findings: Alternative 1 Higher Frequency Commuter Rail

Alternative 1: Higher Frequency Commuter Rail

Goal:
 Assess costs and benefits of providing predictable, bi-directional service every **30 minutes during peak periods and 60 minutes during off-peak periods to all stations***, with modest investments in new infrastructure

Key Features	
Typical Frequency (Peak/Off-Peak)	All Stations*: 30/60 bi-directional
Station Accessibility	High-level boarding platforms at stations where they are currently existing or programmed
Electrification	None
Train Type(s)	Diesel Locomotives

Major Expansions South Coast Rail Phase 1



***Note:** Approximate 30 minute peak period and 60 minute off-peak period service applies to all stations, with the exception of Mishawum, Plimptonville, Wickford Jctn, TF Green and Old Colony/SCR Stations, which are consistent with today's service schedules.

Alternative 1: Higher Frequency Commuter Rail – Preliminary Ridership (2040)

- Daily boardings compared against 2040 No-Build Demand
- Assumes current fares; **fully constrained parking**

Daily Boardings	No-Build	Alternative 1	Change in Daily Boardings	% Change in Daily Boardings	Findings on Growth
Commuter Rail	150,800	169,800	19,000	13%	Overall growth
North Side	46,100	54,700	8,600	19%	Highest on Newburyport/Rockport and Fitchburg Lines
South Side	104,700	115,100	10,400	10%	Highest on Framingham/Worcester Line; Old Colony/SCR service pattern does not change in Alternative 1
Drive Access	92,800	98,100	5,300	6%	Parking is fully constrained
Walk Access	58,000	71,700	13,700	24%	Greater growth in walk access than in drive access
Other Transit Modes	1,500,500	1,506,500	6,000	<1%	Increases on Green, Red, Silver Lines; Blue Line and bus reductions/diversions

Notes: Parking was modeled as fully constrained.

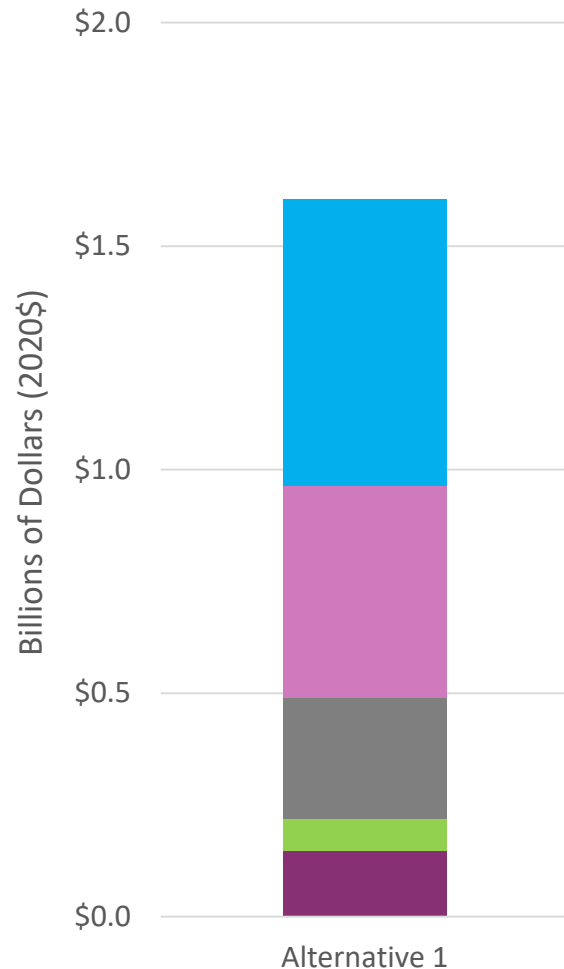
Other transit modes include rapid transit, BRT, local bus (including other RTAs), express bus (including private and Logan buses), shuttle bus (including Logan and MGH shuttles), and ferry. The percentage change for other transit modes is in comparison to the No-Build demand for these modes.

Alternative 1: Preliminary Capital Needs

- Station improvements, including new stations, platforms, tracks, and accessibility upgrades (9 stations)
- Additional track mileage (~4 miles)
- Signals and systems upgrades
- Grade crossing upgrades (6)
- Bridge/Structure improvements or replacements (6)
- Fleet Needs:
 - Equipment
 - Diesel Locomotives
 - Bi-Level Cab Cars and Coachses
 - Maintenance and Layover areas
- Expansions:
 - South Coast Rail Phase 1



Alternative 1: Higher Frequency Commuter Rail – Preliminary Capital Costs



Preliminary Capital Costs (2020\$/2030\$)
\$1.7B (2020\$)/\$2.3B (2030\$)

Improvement Category	Cost (2020\$)
Track and Signal Work	\$0.2B
Structures	\$0.1B
Stations	\$0.3B
Layover and Maintenance Facilities	\$0.5B
Fleet Procurement	\$0.6B

Note: Values are rounded and may not sum to totals. **\$1.7 B (2020\$)**

Fleet costs are based on incremental fleet for diesel options. Total fleet includes:

- 120 locomotives
- 120 bi-level cab cars
- 411 bi-level coaches

Expansions exclude SCR Phase 1



Preliminary Findings: Alternative 2 Regional Rail to Key Stations (Diesel)

Alternative 2: Regional Rail to Key Stations (Diesel)

Goal:

Focus on regional rail – high-frequency service for longer-distance trips to key stations – using mainly diesel-powered locomotives. Key stations are in Gateway Cities, dense areas outside the core, and/or provide regional access and transit connectivity. Stations not identified as key stations would receive more modest increases in service.

Key Features

Typical Frequency (Peak/Off-Peak)

Key Stations (North Side): 15/15 bi-directional
Key Stations (South Side): 30/30 bi-directional
All Other Stations: 30/60 bi-directional

Station Accessibility

All Key Stations would have high-level boarding platforms

Electrification

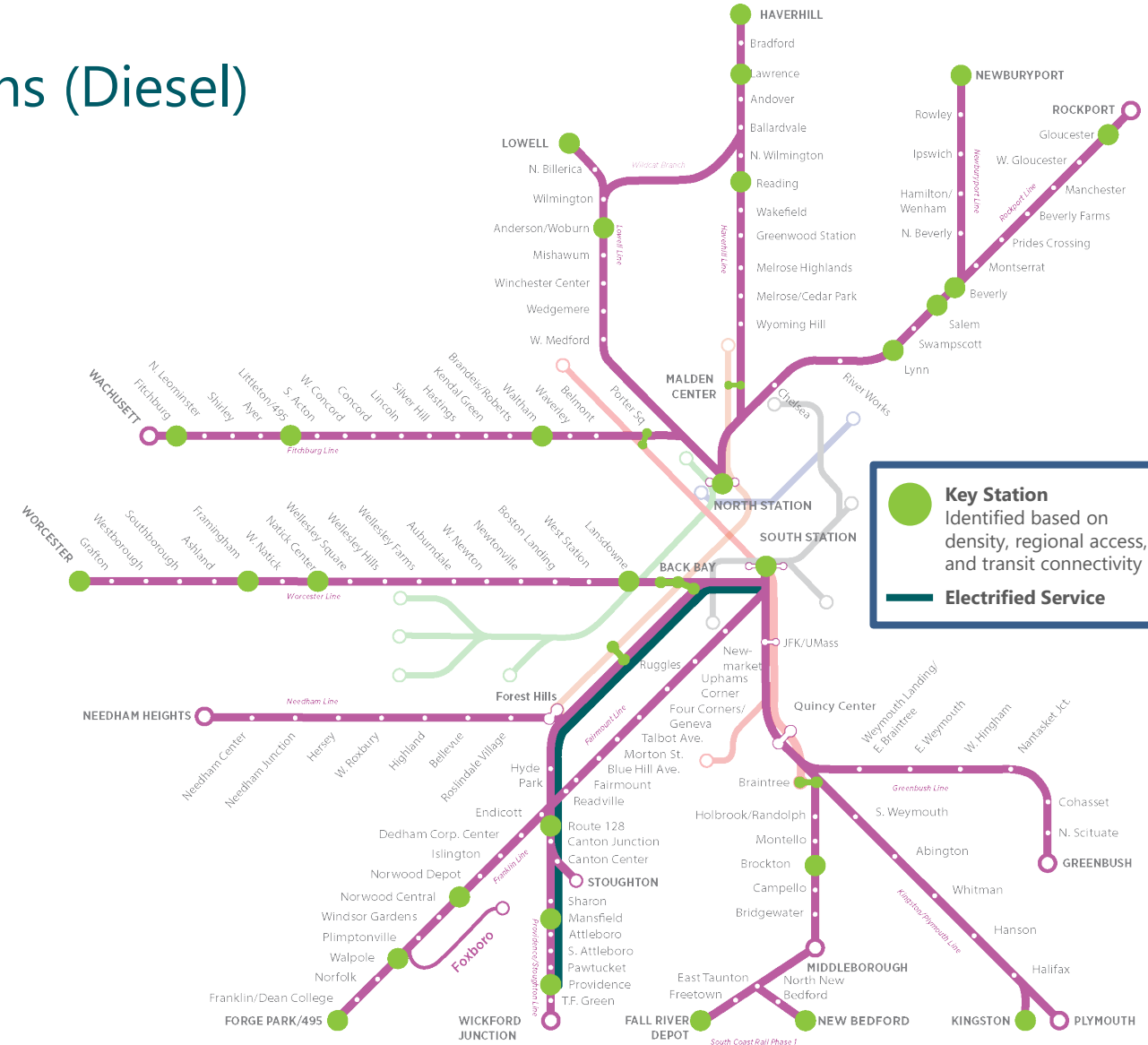
Service between Boston and Providence would be electrified

Train Type(s)

Diesel Locomotives
Electric Locomotives (to Providence)

Major Expansions

South Coast Rail Phase 1
Foxboro



Alternative 2: Regional Rail to Key Stations (Diesel) – Preliminary Ridership (2040)

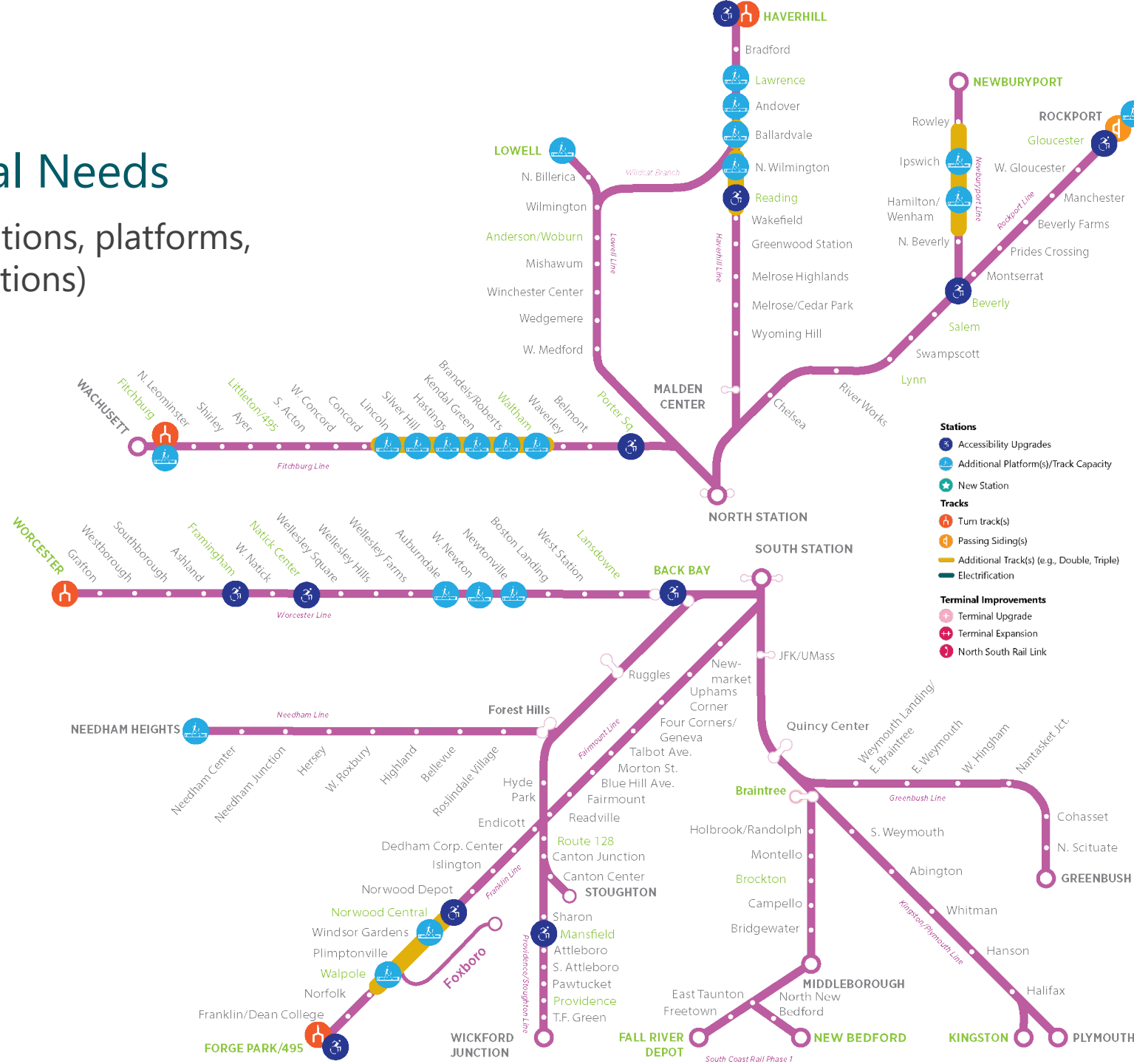
- Daily boardings compared against 2040 No-Build Demand
- Assumes current fares; **unconstrained parking at Key Stations**

Daily Boardings	No-Build	Alternative 2	Change in Daily Boardings	% Change in Daily Boardings	Findings on Growth
Commuter Rail	150,800	187,000	36,200	24%	Growth primarily on North Side due to less frequency on South Side (terminal capacity limitations)
North Side	46,100	70,200	24,100	52%	Highest on Fitchburg and Haverhill/Lowell Lines
South Side	104,700	116,800	12,100	12%	Highest on Framingham/ Worcester Line; Reductions on Old Colony lines due to diversions to unconstrained parking (e.g., Red Line/Braintree)
Drive Access	92,800	103,000	10,200	11%	Ridership increases at key stations near major roadways
Walk Access	58,000	84,000	26,000	45%	Ridership increases around dense urban key stations
Other Transit Modes	1,500,500	1,541,000	40,500	3%	Highest on Red Line, Green Line; Local bus reductions/diversions

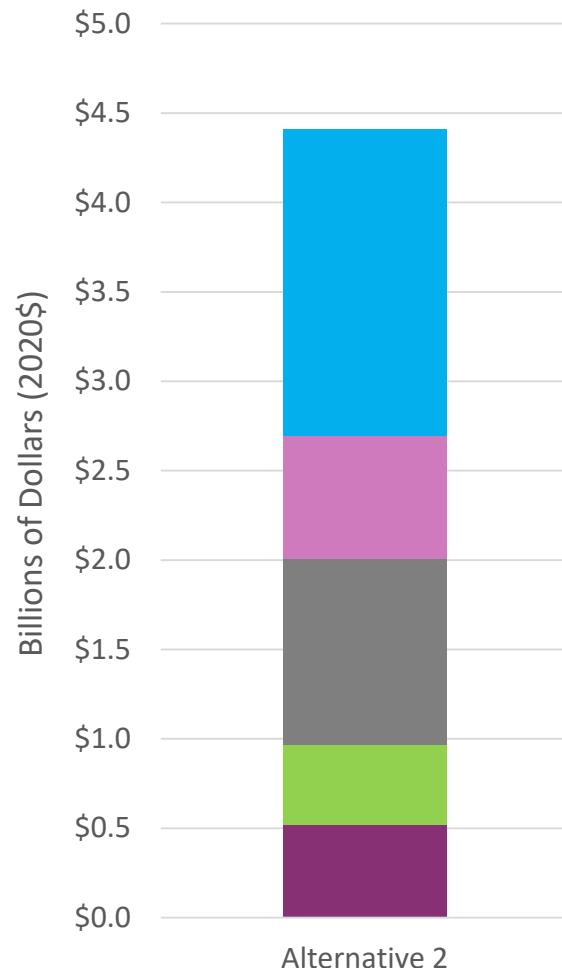
Notes: Parking was modeled as unconstrained at at Gloucester, Newburyport, Beverly, Salem, Lynn, Haverhill, Lawrence, Reading, Lowell, Anderson/Woburn, Fitchburg, Littleton/495, Waltham, Worcester, Framingham, Natick Center, Forge Park/495, Walpole, Norwood Central, Providence, Mansfield, Route 128, Fall River Depot, New Bedford, Brockton, Kingston, and Braintree. Other transit modes include rapid transit, BRT, local bus (including other RTAs), express bus (including private and Logan buses), shuttle bus (including Logan and MGH shuttles), and ferry. The percentage change for other transit modes is in comparison to the No-Build demand for these modes.

Alternative 2: Preliminary Capital Needs

- Station improvements, including new stations, platforms, tracks, and accessibility upgrades (32 stations)
- Additional track mileage (~34 miles)
- Signals and systems upgrades
- Grade crossing upgrades (35)
- Bridge/Structure improvements or replacements (36)
- Fleet Needs:
 - Equipment
 - Diesel Locomotives
 - Electric Locomotives
 - Bi-Level Cab Cars and Coaches
 - Maintenance and Layover areas
- Expansions:
 - South Coast Rail Phase 1
 - Foxboro



Alternative 2: Regional Rail to Key Stations (Diesel) – Preliminary Capital Costs



Preliminary Capital Costs (2020\$/2030\$)
\$4.5B (2020\$)/\$6.3B (2030\$)

Improvement Category	Cost (2020\$)
Track and Signal Work	\$0.5B
Structures	\$0.4B
Stations	\$1.0B
Layover and Maintenance Facilities	\$0.7B
Fleet Procurement	\$1.7B

Note: Values are rounded and may not sum to totals.

\$4.5B (2020\$)

Fleet costs are based on incremental fleet for diesel options. Total fleet includes:

- 163 locomotives
- 163 bi-level cab cars
- 529 bi-level coaches

Expansions exclude SCR Phase 1, Foxboro



Preliminary Findings: Alternative 3 Regional Rail to Key Stations (Electric)

Alternative 3: Regional Rail to Key Stations (Electric)

Goal:

Focus on regional rail – high-frequency service for longer-distance trips to key stations – flexible electric-powered train sets called electric multiple units (EMUs) that can vary in train size to meet demand. Key stations are in Gateway Cities, dense areas outside the core, and/or provide regional access and transit connectivity. Stations not identified as key stations would receive more modest increases in service.

Key Features

Typical Frequency (Peak/Off-Peak)

Key Stations: 15/15 bi-directional
All Other Stations: 30/60 bi-directional

Station Accessibility

All Key Stations would have high-level boarding platforms

Electrification

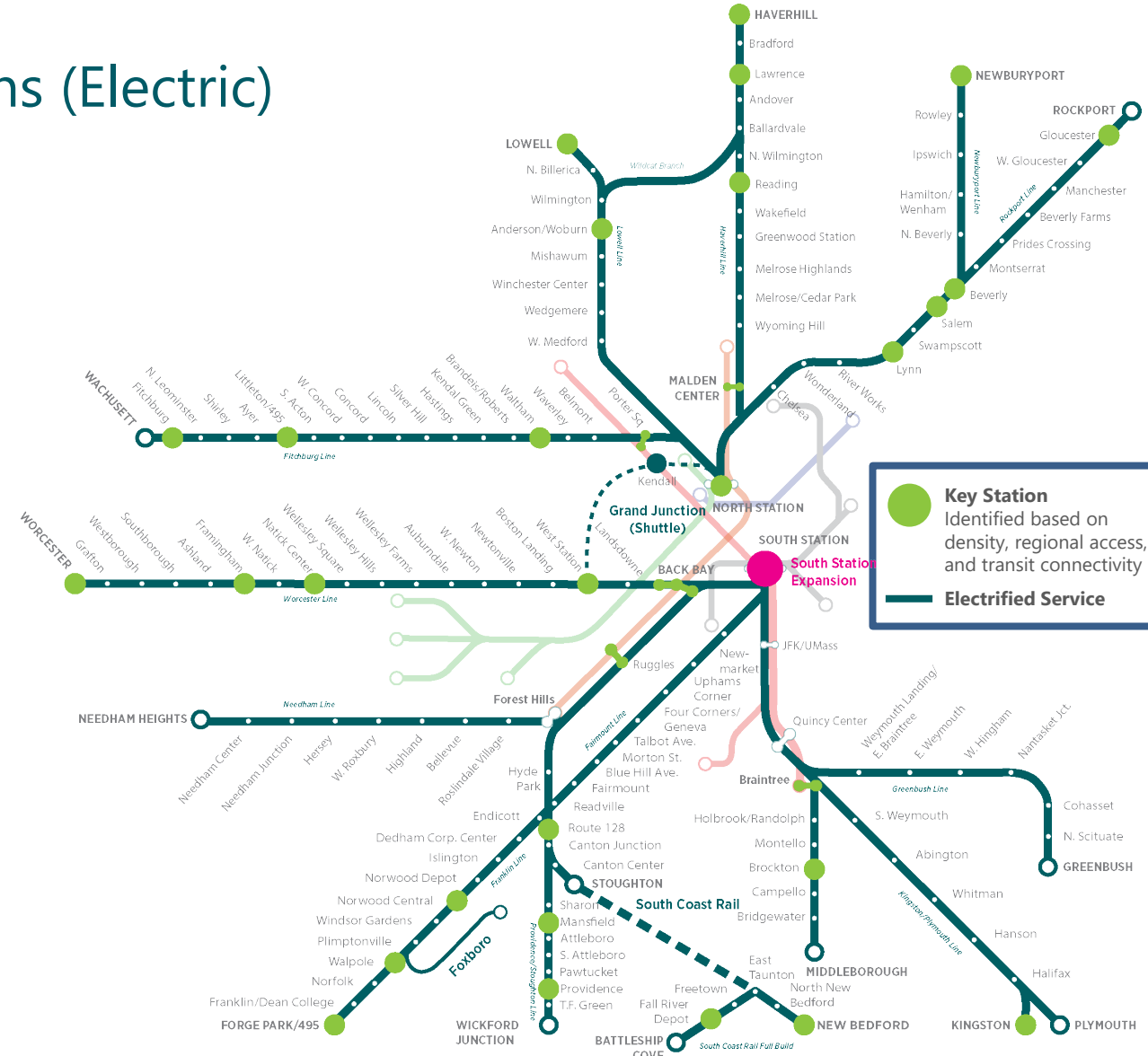
The full system would be electrified

Train Type(s)

Electric Multiple Units (EMUs)

Major Expansions

South Station Expansion
South Coast Rail Full Build
Grand Junction (Shuttle)
Foxboro




Alternative 3: Regional Rail to Key Stations (Electric) – Preliminary Ridership (2040)

- Daily boardings compared against 2040 No-Build Demand
- Assumes current fares; **unconstrained parking at Key Stations**

Daily Boardings	No-Build	Alternative 3	Change in Daily Boardings	% Change in Daily Boardings	Findings on Growth
Commuter Rail	150,800	203,700	52,900	35%	SSX allows for more south side growth than in Alternative 2; Some ridership growth from electrification
North Side	46,100	74,600	28,500	62%	Highest on Fitchburg and Haverhill/Lowell Lines
South Side	104,700	129,100	24,400	23%	Highest on Framingham/ Worcester Line and Providence/SCR Full Build; Reductions on Old Colony Lines due to interlining (Kingston/ Greenbush) and diversions to unconstrained parking (e.g., Red Line/Braintree)
Drive Access	92,800	112,200	19,400	21%	Ridership increases at key stations near major roadways
Walk Access	58,000	91,500	33,500	58%	Ridership increases around dense urban key stations
Other Transit Modes	1,500,500	1,548,400	47,900	3%	Highest on Red Line, Orange Line, Green Line; MBTA local bus reductions/diversions

Notes: Parking was modeled as unconstrained at at Gloucester, Newburyport, Beverly, Salem, Lynn, Haverhill, Lawrence, Reading, Lowell, Anderson/Woburn, Fitchburg, Littleton/495, Waltham, Worcester, Framingham, Natick Center, Forge Park/495, Walpole, Norwood Central, Providence, Mansfield, Route 128, Fall River Depot, New Bedford, Brockton, Kingston, and Braintree. Other transit modes include rapid transit, BRT, local bus (including other RTAs), express bus (including private and Logan buses), shuttle bus (including Logan and MGH shuttles), and ferry. The percentage change for other transit modes is in comparison to the No-Build demand for these modes.

Alternative 3: Preliminary Capital Needs

- Station improvements, including new stations, platforms, tracks, and accessibility upgrades (38 stations)
 - Additional track mileage (~ 50 miles)
 - Signals and systems upgrades
 - Grade crossing upgrades (51)
 - Bridge/Structure improvements or replacements (~50)
 - Fleet Needs:
 - Equipment (EMUs)
 - Maintenance and Layover areas
 - Electrification
 - Expansions
 - South Coast Rail Full Build
 - South Station Expansion
 - Grand Junction
 - Foxboro
- 



Alternative 3: Regional Rail to Key Stations (Electric) – Preliminary Capital Costs

Preliminary Capital Costs (2020\$/2030\$)

\$17.9B (2020\$)/\$25.2B (2030\$)



Improvement Category	Cost (2020\$)
Track and Signal Work	\$0.6B
Structures	\$0.6B
Stations	\$1.2B
Layover and Maintenance Facilities	\$0.6B
Fleet Procurement	\$4.8B
Electrification	\$6.0B
System Expansions <ul style="list-style-type: none"> South Station Expansion Modified North Station Grand Junction Old Colony Braintree to S Station Double Track 	\$4.0B

Note: Values are rounded and may not sum to totals.

\$17.9B (2020\$)

Fleet costs are based on need for entire new electric fleet. Total fleet includes:

- 733 EMUs

Expansions exclude SCR Full Build and Foxboro



Preliminary Findings: Alternative 4 Urban Rail (Diesel)

Alternative 4: Urban Rail (Diesel)

Goal:

Focuses on urban rail – high-frequency, rapid-transit-like service to stations in the inner core – using flexible diesel-powered train sets called diesel multiple units (DMUs) that can vary in train size to meet demand. Stations in the outer regions of the system would receive more modest increases in service.

Key Features

Typical Frequency (Peak/Off-Peak)

Inner Core: 15/15 bi-directional
All Other Stations: 30/60 bi-directional

Station Accessibility

All Inner Core Stations would have high-level boarding platforms

Electrification

None

Train Type(s)

Diesel Locomotives
Single-Level Diesel Multiple Units (DMUs)

Major Expansions

South Station Expansion
South Coast Rail Phase 1



Alternative 4: Urban Rail (Diesel) – Preliminary Ridership (2040)

- Daily boardings compared against 2040 No-Build Demand
- Assumes current fares; **unconstrained parking at Urban Rail Termini**

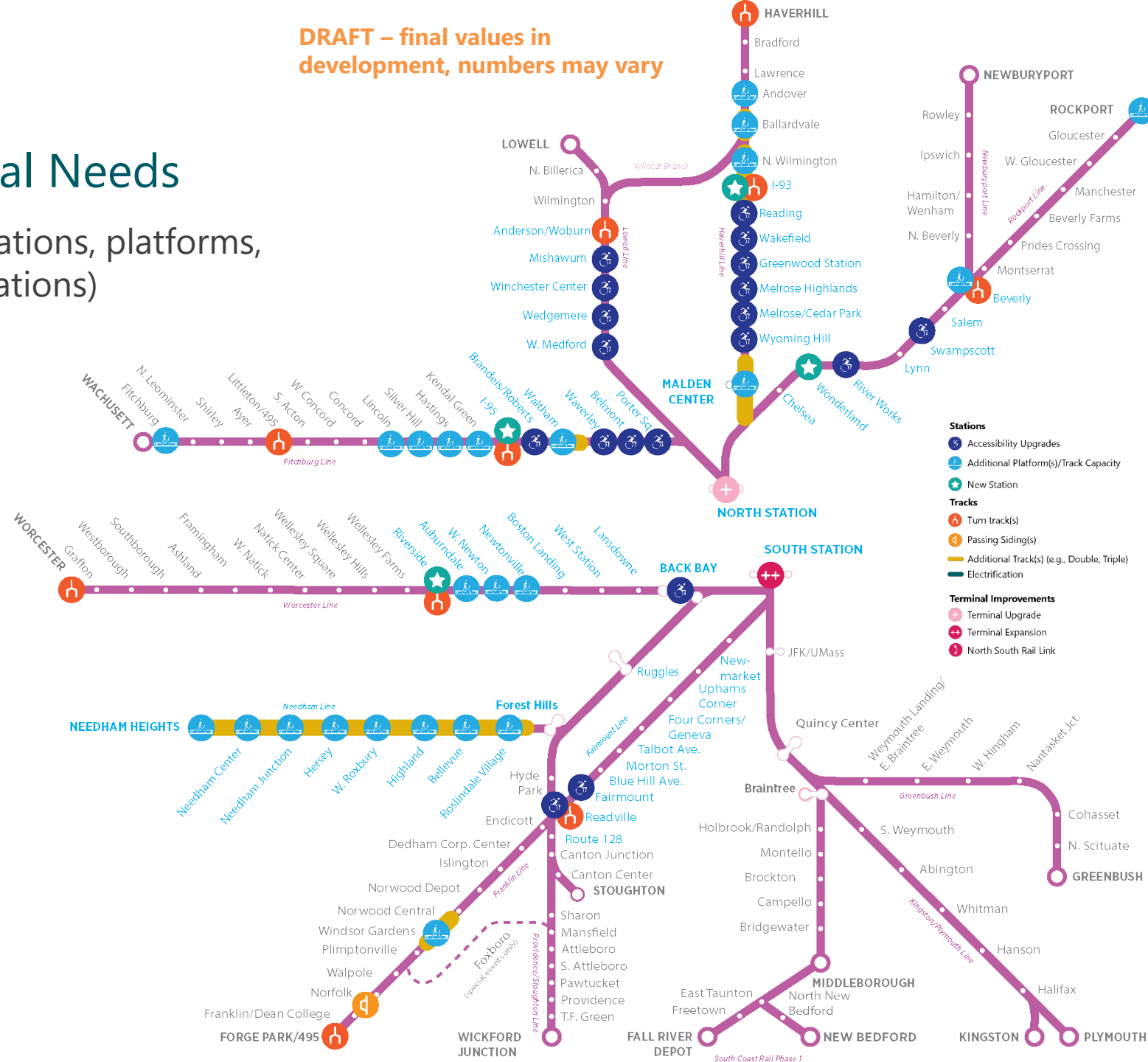
Daily Boardings	No-Build	Alternative 4	Change in Daily Boardings	% Change in Daily Boardings	Findings on Growth
Commuter Rail	150,800	231,200	80,400	53%	Highest absolute growth on the South Side, but greater % increase on the North Side
North Side	46,100	76,900	30,800	67%	Highest on Newburyport/Rockport
South Side	104,700	154,300	49,600	47%	Highest on Framingham/Worcester Line; Reductions on some lines due to diversions to other lines
Drive Access	92,800	105,400	12,600	14%	Due to unconstrained parking at urban rail termini
Walk Access	58,000	125,800	67,800	117%	Ridership increases in the dense inner core
Other Transit Modes	1,500,500	1,470,100	-30,400	-2%	Diversions to urban rail

Notes: Parking was modeled as unconstrained at Beverly, I-93, Anderson/Woburn, I-95, Riverside, Needham Heights, and Route 128. Other transit modes include rapid transit, BRT, local bus (including other RTAs), express bus (including private and Logan buses), shuttle bus (including Logan and MGH shuttles), and ferry. The percentage change for other transit modes is in comparison to the No-Build demand for these modes. Emissions, equity, and connectivity will be analyzed for each alternative as part of the upcoming analysis.

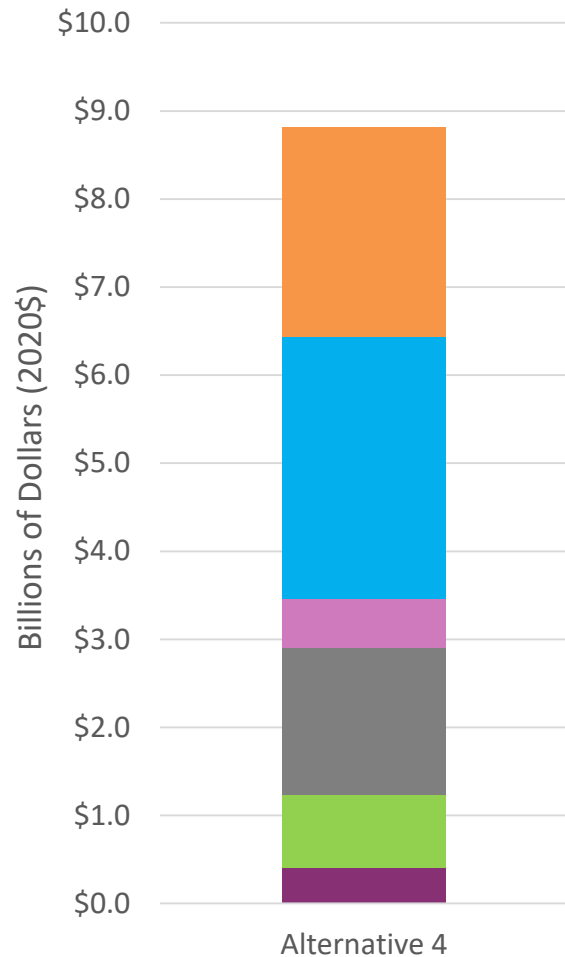
Alternative 4: Preliminary Capital Needs

- Station improvements, including new stations, platforms, tracks, and accessibility upgrades (47 stations)
- Additional track mileage (~24 miles)
- Signals and systems upgrades
- Grade crossing upgrades (21)
- Bridge/Structure improvements or replacements (49)
- Fleet Needs:
 - Equipment
 - Diesel Locomotives
 - Bi-Level Cab Cars and Coaches
 - DMUs
 - Maintenance and Layover areas
- Expansions:
 - South Station Expansion
 - South Coast Rail Phase 1

DRAFT – final values in development, numbers may vary



Alternative 4: Urban Rail (Diesel) – Preliminary Capital Costs



Preliminary Capital Costs (2020\$/2030\$)
\$8.9B (2020\$)/\$12.6B (2030\$)

Improvement Category		Cost (2020\$)
Track and Signal Work		\$0.4B
Structures		\$0.8B
Stations		\$1.7B
Layover and Maintenance Facilities		\$0.6B
Fleet Procurement		\$3.0B
System Expansions		\$2.4B
- South Station Expansion		
- Modified North Station		

Note: Values are rounded and may not sum to total.

\$8.9B (2020\$)

Fleet costs are based on incremental fleet, and include entirely new DMU fleet. Total fleet includes:

- 114 locomotives
- 114 bi-level cab cars
- 443 bi-level coaches
- 336 DMUs

Expansions exclude SCR Phase 1



Preliminary Findings: Alternative 5 Urban Rail (Electric)

Alternative 5: Urban Rail (Electric)

Goal:

Focus on urban rail – high-frequency, rapid-transit-like service to stations in the inner core – using flexible electric-powered train sets called electric multiple units (EMUs) that can vary in train size to meet demand. Stations in the outer regions of the system would receive more modest increases in service.

Key Features

Typical Frequency (Peak/Off-Peak)

Inner Core: 15/15 bi-directional
All Other Stations: 30/60 bi-directional

Station Accessibility

All Inner Core Stations would have high-level boarding platforms

Electrification

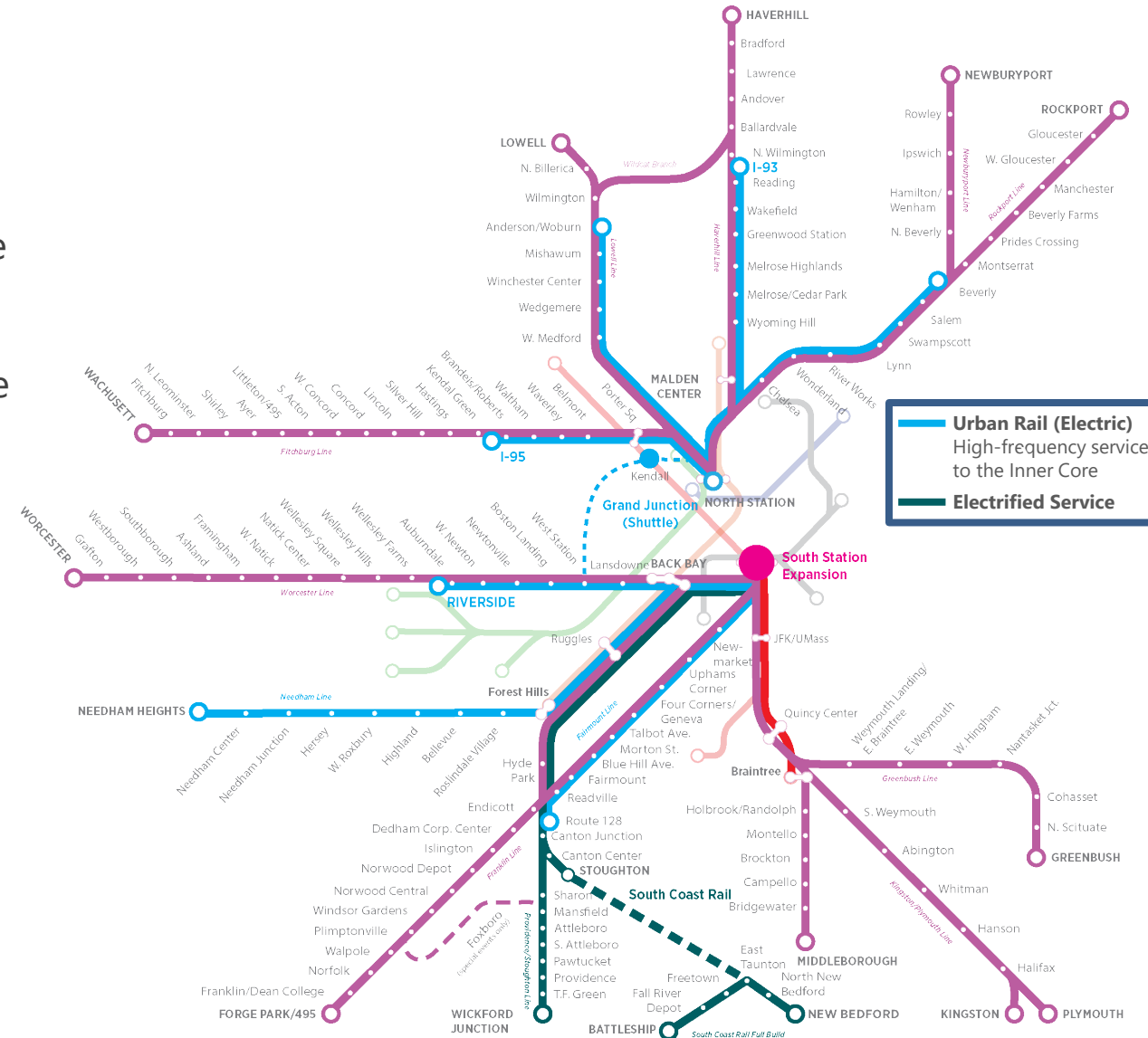
Urban rail service would be electrified
Service on the Providence Line and South Coast Rail would be electrified

Train Type(s)

Diesel + Electric Locomotives
Bi-Level Electric Multiple Units (EMUs)

Major Expansions

South Station Expansion
South Coast Rail Full Build
Grand Junction (Shuttle)



Alternative 5: Urban Rail (Electric) – Preliminary Ridership (2040)

- Daily boardings compared against 2040 No-Build Demand
- Assumes current fares; **unconstrained parking at Urban Rail Termini**

Daily Boardings	No-Build	Alternative 5	Change in Daily Boardings	% Change in Daily Boardings	Findings on Growth
Commuter Rail	150,800	232,400	81,600	54%	Highest absolute growth on the South Side, but greater % increase on the North Side
North Side	46,100	77,000	30,900	67%	Highest on Newburyport/Rockport
South Side	104,700	155,400	50,700	48%	Highest on Framingham/Worcester Line; Reductions on some lines due to diversions to other lines
Drive Access	92,800	103,100	10,300	11%	Due to unconstrained parking at urban rail termini
Walk Access	58,000	129,300	71,300	123%	Ridership increases in the dense inner core
Other Transit Modes	1,500,500	1,478,200	-22,300	-1%	Diversions to urban rail

Notes: Parking was modeled as unconstrained at Beverly, I-93, Anderson/Woburn, I-95, Riverside, Needham Heights, and Route 128. Other transit modes include rapid transit, BRT, local bus (including other RTAs), express bus (including private and Logan buses), shuttle bus (including Logan and MGH shuttles), and ferry. The percentage change for other transit modes is in comparison to the No-Build demand for these modes. Emissions, equity, and connectivity will be analyzed for each alternative as part of the upcoming analysis.

Alternative 5 Modified for Lower Fares: Urban Rail (Electric) – Preliminary Ridership (2040)

- A second version of Alternative 5 was modeled with **lower urban rail fares** to understand impact that fares have on ridership
- Providing a lower fare structure resulted in ridership increases of approximately 7% systemwide total daily boardings, but increases vary by line and occur through both drive and walk access

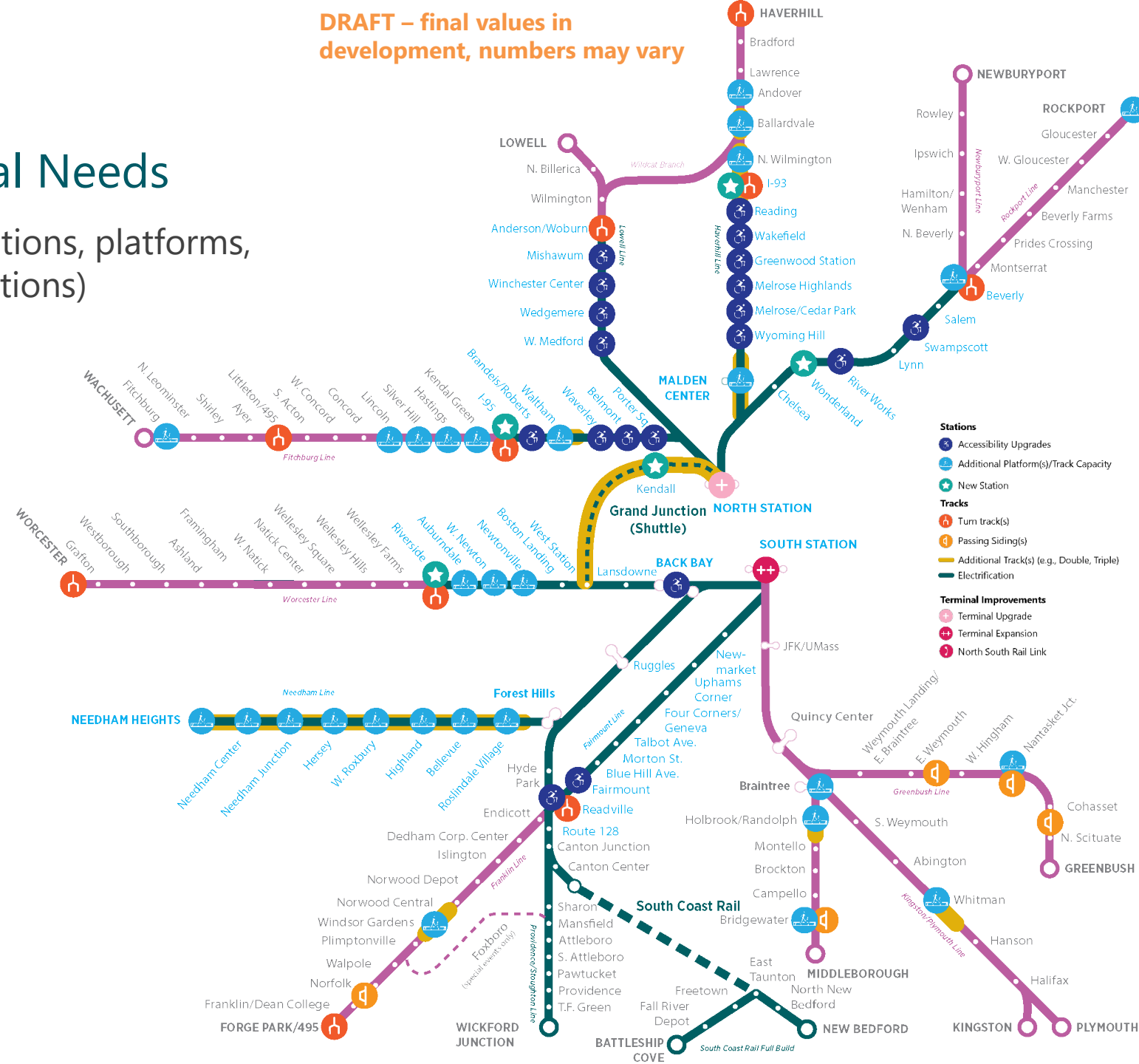
Daily Boardings	Alternative 5 Total Daily Boardings	Alternative 5 Modified for Lower Fares Total Daily Boardings	Change in Total Daily Boardings	% Change in Total Daily Boardings	Findings Related to Lower Fares
Commuter Rail	232,400	249,800	+17,400	7%	Highest benefit on North Side
North Side	77,000	92,200	+15,200	20%	Highest growth on Fitchburg Line; all lines at least 15% growth
South Side	155,400	157,600	+2,200	1%	Limited growth on all urban rail lines
Drive Access	103,100	112,800	+9,700	9%	Lower fares increase drive access to urban rail fare zones
Walk Access	129,300	137,000	+7,700	6%	Some increase in walk access due to lower fares
Other Transit Modes	1,478,200	1,472,000	-6,200	0%	Diversions to urban rail greatest on Blue Line

Notes: Parking was modeled as unconstrained at Beverly, I-93, Anderson/Woburn, I-95, Riverside, Needham Heights, and Route 128. The modeling for the lower fare alternative assumed a flat urban rail fare between the existing Zone 1A and Zone 1 pricing. Zone 1A trips maintained Zone 1A pricing. Other transit modes include rapid transit, BRT, local bus (including other RTAs), express bus (including private and Logan buses), shuttle bus (including Logan and MGH shuttles), and ferry. The percentage change for other transit modes is in comparison to the No-Build demand for these modes. Emissions, equity, and connectivity will be analyzed for each alternative as part of the upcoming analysis.

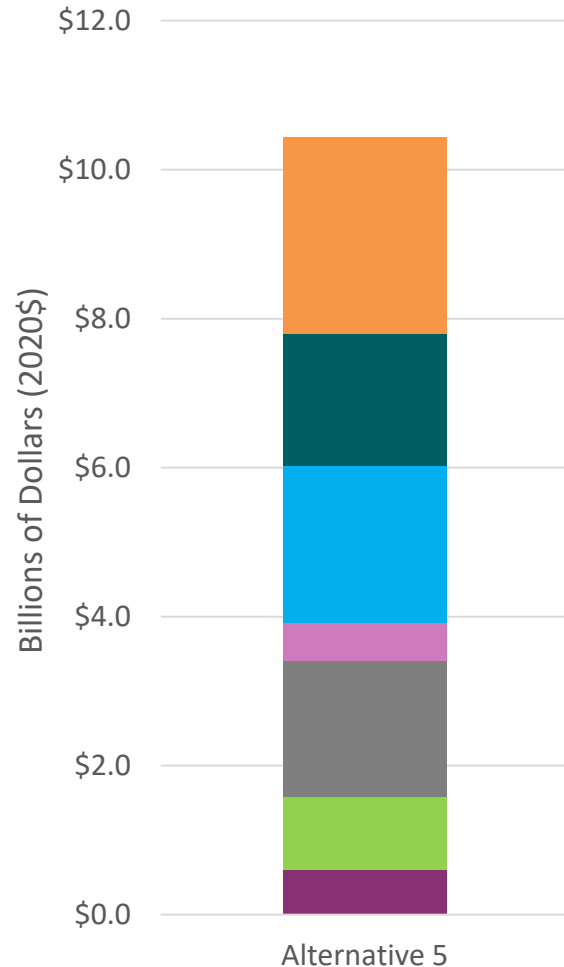
Alternative 5: Preliminary Capital Needs

- Station improvements, including new stations, platforms, tracks, and accessibility upgrades (53 stations)
- Additional track mileage (~39 miles)
- Signals and systems upgrades
- Grade crossing upgrades (40)
- Bridge/Structure improvements or replacements (58)
- Fleet Needs:
 - Equipment
 - Diesel + Electric Locomotives
 - Bi-Level Cab Cars and Coaches
 - EMUs
 - Maintenance and Layover areas
- Partial Electrification
- Expansions:
 - South Station Expansion
 - South Coast Rail Full Build
 - Grand Junction (Shuttle)

DRAFT – final values in development, numbers may vary



Alternative 5: Urban Rail (Electric) – Preliminary Capital Costs



Preliminary Capital Costs (2020\$/2030\$)
\$10.6B (2020\$)/\$14.9B (2030\$)

Improvement Category	Cost (2020\$)
Track and Signal Work	\$0.6B
Structures	\$1.0B
Stations	\$1.8B
Layover and Maintenance Facilities	\$0.5B
Fleet Procurement	\$2.1B
Electrification	\$1.8B
System Expansions <ul style="list-style-type: none"> - South Station Expansion - Modified North Station - Grand Junction 	\$2.6B

Note: Values are rounded and may not sum to totals.

\$10.6B (2020\$)

Fleet costs are based on incremental fleet, and include entirely new EMU fleet. Total fleet includes:

- 112 locomotives
- 112 bi-level cab cars
- 450 bi-level coaches
- 185 EMUs

Expansions exclude SCR Full Build



Preliminary Findings: Alternative 6 Full Transformation

Alternative 6: Full Transformation

Goal:
 Provide a combination of regional rail and urban rail – resulting in high-frequency service throughout the network – using flexible electric-powered train sets called electric multiple units (EMUs) that can vary in train size to meet demand. North-South Rail Link provides through trips for the inner core. Nearly every station in the network would receive service every 15 minutes.

Key Features

Typical Frequency (Peak/Off-Peak)	Key Stations: 15/15 bi-directional Inner Core: 15/15 bi-directional Outer Stations: 15/15 bi-directional where possible
Station Accessibility	All Stations would have high-level boarding platforms
Electrification	The full system would be electrified
Train Type(s)	Electric Multiple Units (EMUs)

Major Expansions	North South Rail Link South Coast Rail Full Build Grand Junction (Shuttle) Foxboro
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Alternative 6: Full Transformation – Preliminary Ridership (2040)

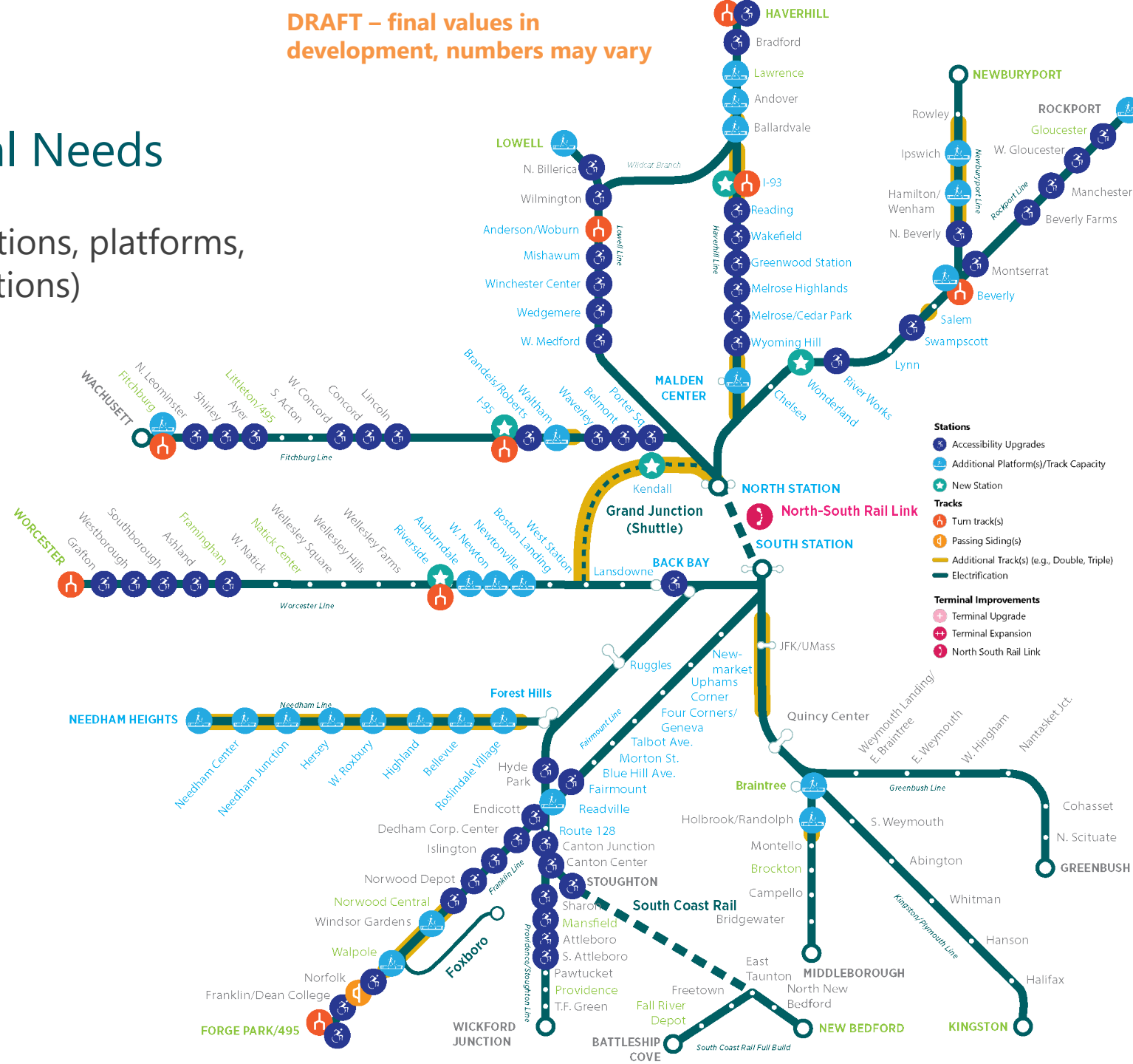
- Daily boardings compared against 2040 No-Build Demand
- Assumes a flat urban rail fare (outside of Zone 1A) and non-urban rail mileage based fares; **unconstrained parking at most stations**

Daily Boardings	No-Build	Alternative 6	Change in Daily Boardings	% Change in Daily Boardings	Findings on Growth
Commuter Rail	150,800	376,700	225,900	150%	Highest absolute growth on the South Side, but greater % increase on the North Side
North Side	46,100	133,100	87,000	189%	Highest on Newburyport/Rockport
South Side	104,700	243,600	138,900	133%	Highest on Framingham/Worcester Line
Drive Access	92,800	187,200	94,400	102%	Unconstrained parking significantly increases drive access
Walk Access	58,000	189,500	131,500	227%	High frequency to high-density locations throughout the network results significant increase in walk access
Other Transit Modes	1,500,500	1,450,400	-50,100	-3%	Diversions from most other transit modes

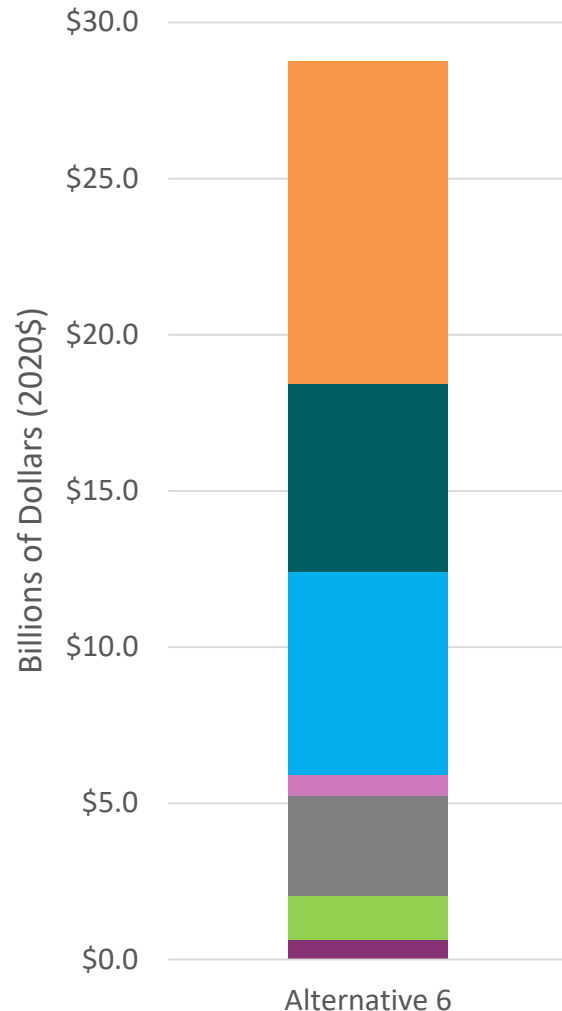
Notes: Parking was modeled as unconstrained at all commuter rail stations that currently have at least 50 spaces and are not rapid transit stations. The modeling assumed a flat urban rail fare between the existing Zone 1A and Zone 1 pricing. Zone 1A trips maintained Zone 1A pricing. All other fares are mileage-based. Growth in north side and south side boardings includes NSRL ridership, and uses an approximate distribution of boardings for through-running trips. Other transit modes include rapid transit, BRT, local bus (including other RTAs), express bus (including private and Logan buses), shuttle bus (including Logan and MGH shuttles), and ferry. The percentage change for other transit modes is in comparison to the No-Build demand for these modes. Emissions, equity, and connectivity will be analyzed for each alternative as part of the upcoming analysis.

Alternative 6: Preliminary Capital Needs

- Station improvements, including new stations, platforms, tracks, and accessibility upgrades (87 stations)
- Additional track mileage (~59 miles)
- Signals and systems upgrades
- Grade crossing upgrades (35)
- Bridge/Structure improvements or replacements (82)
- Fleet Needs:
 - Equipment (EMUs)
 - Maintenance and Layover areas
- Electrification
- Expansions:
 - North South Rail Link
 - South Coast Rail Full Build
 - Grand Junction (Shuttle)
 - Foxboro



Alternative 6: Full Transformation – Preliminary Capital Costs



Preliminary Capital Costs (2020\$/2030\$)
\$28.9B (2020\$)/\$40.7B (2030\$)

Improvement Category	Cost (2020\$)
Track and Signal Work	\$0.6B
Structures	\$1.4B
Stations	\$3.2B
Layover and Maintenance Facilities	\$0.7B
Fleet Procurement	\$6.5B
Electrification	\$6.0B
System Expansions <ul style="list-style-type: none"> - North South Rail Link (Including Modifications)* - Grand Junction - Old Colony Braintree to S Station Double Track 	\$10.3B

Note: Values are rounded and may not sum to totals.

\$28.9B (2020\$)

Fleet costs are based on need for entire new electric fleet. Total fleet includes:

- 964 EMUs

Expansions exclude SCR Full Build and Foxboro

Summary of Alternatives 1- 6



O&M Costs and Revenues in Alternatives 1-6

- Each alternative results in a change in systemwide revenue and commuter rail O&M costs
- Revenue increases are due to ridership gains, which are partially offset by shifts from higher zone stations to lower zone stations (due to the differences across stations in frequency, unconstrained parking, or fares)
- Systemwide revenues do not account for non-fare revenue sources (e.g., parking)
- O&M costs do not reflect potential changes in O&M costs on other modes (e.g., bus, rapid transit)

Annualized Increase/Year (in 2020\$)	Alternative 1: Higher Frequency Commuter Rail	Alternative 2: Regional Rail to Key Stations (Diesel)	Alternative 3: Regional Rail to Key Stations (Electric)	Alternative 4: Urban Rail (Diesel)	Alternative 5: Urban Rail (Electric)	Alternative 5: Urban Rail (Electric) with Modified Fares	Alternative 6: Full Transformation
Incremental MBTA Systemwide Revenues	\$29M/Year	\$52M/Year	\$52M/Year	\$58M/Year	\$48M/Year	\$15M/Year	\$80M/Year
Incremental MBTA Commuter Rail O&M Costs	\$130M/Year	\$379M/Year	\$439M/Year	\$333M/year	\$304M/year	\$304M/year	\$643M/year

Parking Capacity and Demand in Alternatives 1-6

- Ridership increases are partially driven by unconstrained parking for Alternatives 2-6
- Drive access boardings increase in all alternatives
- Drive access comparison to existing capacity demonstrates a need for additional parking to support the projected ridership

	Approximate Existing Parking Availability	Alternative 1: Higher Frequency Commuter Rail	Alternative 2: Regional Rail to Key Stations (Diesel)	Alternative 3: Regional Rail to Key Stations (Electric)	Alternative 4: Urban Rail (Diesel)	Alternative 5: Urban Rail (Electric)	Alternative 6: Full Transformation
Daily Drive Access Boardings (2040)	~43,000 Spaces Exist Today (Includes both Public and Private)	98,100	103,000	112,200	105,400	103,100	187,200
Additional Parking Spaces Required*		~10,000	~15,000	~21,000	~16,000	~16,000	~45,000

Note: Parking capacities were estimated for each station based on the Boston MPO 2012-13 *Inventory of Park-and-Ride Lots at MBTA Facilities*, and was updated based on the MBTA website and further review. Station-level estimates include MBTA facilities as well as municipal and private facilities. Station-level estimates were aggregated to the line-level and compared to line-level drive access boardings, assuming that every two drive access boardings (one inbound and one outbound boarding) requires one parking space. This results in a conservative estimate of the additional parking spaces required as it does not account for potential kiss-and-ride boardings included in the drive access totals, and assumes all drive access boardings are in single-occupancy vehicles. For Alternative 6, drive access boardings on trips traveling through the North South Rail Link were distributed to the line level based on the period-level directional ridership.

Automobile Use Projections

- Reductions in vehicle use, as well as auto diversions identified for all alternatives and compared to No Build statewide totals
- Percentage reduction in VHT greater than percentage reduction in VMT

Compared to No-Build	Alternative 1: Higher Frequency Commuter Rail	Alternative 2: Regional Rail to Key Stations (Diesel)	Alternative 3: Regional Rail to Key Stations (Electric)	Alternative 4: Urban Rail (Diesel)	Alternative 5: Urban Rail (Electric)	Alternative 6: Full Transformation
Change in Annual Vehicle Miles Traveled (VMT) (miles/year) <i>(% change statewide)</i>	-60.2 Million (-0.1%)	-189.6 Million (-0.3%)	-261.7 Million (-0.4%)	-174.3 Million (-0.3%)	-166.8 Million (-0.2%)	-428.4 Million (-0.6%)
Change in Annual Vehicle Hours Traveled (VHT) (hours/year) <i>(% change statewide)</i>	-7.9 Million (-0.3%)	-44.9 Million (-1.8%)	-52.9 Million (-2.1%)	-39.6 Million (-1.6%)	-37.5 Million (-1.5%)	-66.0 Million (-2.7%)
Change in Annual Auto Person Trips <i>(% change statewide)</i>	-2.6 Million (-0.03%)	-11.2 Million (-0.12%)	-15.3 Million (-0.16%)	-19.8 Million (-0.21%)	-18.8 Million (-0.20%)	-36.8 Million (-0.39%)

Comparison of Alternatives 1-6 – Preliminary Results

DRAFT – final values in development, numbers may vary

	Alternative 1: Higher Frequency Commuter Rail	Alternative 2: Regional Rail to Key Stations (Diesel)	Alternative 3: Regional Rail to Key Stations (Electric)	Alternative 4: Urban Rail (Diesel)	Alternative 5: Urban Rail (Electric)	Alternative 5: Urban Rail (Electric) with Modified Fares	Alternative 6: Full Transformation
2040 Ridership (compared to No-Build)	+ 19,000 daily CR boardings (+ 13%)	+ 36,200 daily CR boardings (+ 24%)	+ 52,900 daily CR boardings (+ 35%)	+ 80,400 daily CR boardings (+ 53%)	+ 81,600 daily CR boardings (+ 54%)	+ 99,000 daily CR boardings (+ 66%)	+ 225,900 daily CR boardings (+ 150%)
	+5,300 drive access +13,700 walk access	+10,200 drive access +26,000 walk access	+19,400 drive access +33,500 walk access	+12,600 drive access +67,800 walk access	+10,300 drive access +71,300 walk access	+20,000 drive access +79,000 walk access	+94,400 drive access +131,500 walk access
Assumptions:							
-Fare Structure	-Current fares	-Current fares	-Current fares	-Current fares	-Current fares	-Urban rail fares	-Urban rail fares and distance-based fares
-Parking	-Parking constrained	-Parking unconstrained at most key stations	-Parking unconstrained at most key stations	-Parking unconstrained at urban rail termini	-Parking unconstrained at urban rail termini	-Parking unconstrained at urban rail termini	-Parking unconstrained at all stations (excluding rapid transit & limited parking stations)
Fleet Needs	Diesel Locomotives Bi-Level Cab Cars/Coaches	Locomotives Bi-Level Cab Cars/Coaches	Bi-level EMUs	Diesel Locomotives Bi-Level Cab Cars/Coaches Single-Level DMUs	Locomotives Bi-Level Cab Cars/Coaches Bi-Level EMUs	Locomotives Bi-Level Cab Cars/Coaches Bi-Level EMUs	Bi-Level EMUs
Preliminary Capital Costs (2020\$/ 2030\$)	\$1.7B (2020\$)/ \$2.3B (2030\$)	\$4.5B (2020\$)/ \$6.3B (2030\$)	\$17.9B (2020\$)/ \$25.2B (2030\$)	\$8.9B (2020\$)/ \$12.6B (2030\$)	\$10.6B (2020\$)/ \$14.9B (2030\$)	\$10.6B (2020\$)/ \$14.9B (2030\$)	\$28.9B (2020\$)/ \$40.7B (2030\$)
Incremental MBTA Systemwide Revenues (2020\$)	\$29M/Year	\$52M/Year	\$52M/Year	\$58M/Year	\$48M/Year	\$15M/Year	\$80M/Year
Incremental MBTA Commuter Rail O&M Costs (2020\$)	\$130M/Year	\$379M/Year	\$439M/Year	\$333M/year	\$304M/year	\$304M/year	\$643M/year

Next Steps



Next Steps – Advancing the Rail Vision

- Joint FMCB + Rail Vision Advisory Committee Meeting – October 28
- FMCB Next Steps Discussion – November

Public Comment



Alternative 1

What if you could catch a Commuter Rail train more frequently in either direction, all day?

Cost: \$1.7 billion*

**\$2.3 billion, when adjusted for 2030 inflation*

Time Period	Typical Frequency ¹
Peak	Every 30 min
Off-Peak	Every 60 min



¹In both directions

ALTERNATIVE 1

How do we make this happen?

+ Invest \$600 million in fleet expansion.

We'll add more locomotives to provide more frequency and more bi-level coaches for more seats.

+ **Improve stations and tracks.** We'll add 4 miles of track and add platforms at 9 stations so we can offer equal service in both directions all day.

Why is this good for riders?

With Alternative 1, more trains will come more often to stations across the system.

This means riders will have more options, and we'll be able to accommodate the growth in ridership we expect and take additional drivers off the road. Our projections found:

North Side: A 19% ridership increase—8,600 more daily boardings vs. the “no-build” outlook

South Side: A 10% ridership increase—10,400 more daily boardings vs. the “no-build” outlook

Service Features

In addition to higher frequency, Alternative 1 imagines a more expansive Commuter Rail system.

Expansion --o

We'll extend the Middleborough Line to add service to New Bedford and Fall River through the [South Coast Rail project](#).

Accessibility ♿

Stations where there are currently plans for accessibility upgrades will get high-level boarding platforms.

No-Build Outlook

By 2040, even without service or infrastructure changes, we expect population and employment growth will expand ridership by 24,000.

With Rail Vision, we are looking to transform the existing system into one that better supports improved mobility and economic competitiveness in Greater Boston.

Alternative 2

What if you could catch a Commuter Rail train **every 15 or 30 minutes** to any key station at any time of day?

Cost: \$4.5 billion*

*\$6.3 billion, when adjusted for 2030 inflation

Station Type

Typical Frequency¹

North Side Key Stations

Every 15 min

South Side Key Stations

Every 30 min

All Other Stations

Every 30 min peak
Every 60 min off peak

Key stations are located in dense areas outside central Boston, and/or locations that provide regional access and transit connectivity.



¹In both directions

ALTERNATIVE 2

How do we make this happen?

+ Invest \$1.7 billion in fleet expansion. We'll add more locomotives, including our first electric locomotives, to provide more frequency, and more bi-level coaches for more seats.

+ Improve stations and tracks. We'll add 34 miles of track and add platforms to 21 stations so we can offer equal service in both directions all day.

Why is this good for riders?

With Alternative 2, more trains will come more often to gateway cities, dense communities outside the core, and stations that are convenient to highways.

This means riders will have more options, and we'll be able to accommodate the growth in ridership we expect and take some drivers off the road. Our projections found:

North Side: 52% ridership increase with 24,100 more daily boardings vs. the "no-build" scenario

South Side: 12% ridership increase with 12,100 more daily boardings vs. the "no-build" scenario

For 15-minute frequencies on the South Side Lines, see Alternative 3.

No-Build Outlook

By 2040, even without service or infrastructure changes, we expect population and employment growth will expand ridership by 24,000.

With Rail Vision, we are looking to transform the existing system into one that better supports improved mobility and economic competitiveness in Greater Boston.

Service Features

In addition to higher frequency, Alternative 2 imagines a more accessible, more expansive, partially electric Commuter Rail system.

Electrification ⚡

This alternative includes electrified service between Boston and Providence with electric locomotives, which reduce emissions, improve air quality, and get up to speed faster.

Accessibility ♿

We'll add full high-level boarding platforms at 11 stations for fewer barriers to access and quicker boarding time. All key stations will have full high-level boarding platforms.

Expansion ➡

We'll add regular service to Foxboro, and extend the Middleborough Line to add service to New Bedford and Fall River through the [South Coast Rail project](#).

ALTERNATIVE 3

How do we make this happen?

- + **Invest \$4.8 billion to replace and expand our fleet.** We'll add 733 self-powered electric vehicles for more frequency and more seats.
- + **Add 7 platforms at South Station.** We'll be able to run trains more frequently to all south side lines all day.
- + **Improve stations and tracks.** We'll add 50 miles of track and add platforms to 28 stations so we can offer equal service in both directions all day.

Why is this good for riders?

With Alternative 3, more trains will come more often to gateway cities, dense communities outside the core, and stations that are convenient to highways.

This means riders will have more options, and we'll be able to accommodate the growth in ridership we expect and take additional drivers off the road. Our projections found:

North Side: A 62% ridership increase—28,500 more daily boardings vs. the “no-build” outlook

South Side: A 23% ridership increase—24,400 more daily boardings vs. the “no-build” outlook

No-Build Outlook

By 2040, even without service or infrastructure changes, we expect population and employment growth will expand ridership by 24,000.

With Rail Vision, we are looking to transform the existing system into one that better supports improved mobility and economic competitiveness in Greater Boston.

Service Features

In addition to higher frequency, Alternative 3 imagines a more accessible, more expansive, fully electric Commuter Rail system.

Electrification ⚡

This alternative includes electrified service across our entire rail network. Electric trains reduce emissions, improve air quality, and run like subway trains—speeding up and slowing down faster so travel times between stations are shorter.

Accessibility ♿

We'll add full high-level boarding platforms at 11 stations for fewer barriers to access and quicker boarding time. All key stations will have full high-level boarding platforms.

Expansion ➡

We'll add regular service to Foxboro, and extend the Stoughton Line to connect more communities to Fall River and New Bedford through the [South Coast Rail project](#).

Shuttle service will connect North Station to a future West Station in Allston through the Kendall/MIT neighborhood.

Alternative 4

What if you could catch a Commuter Rail train **every 15 minutes** at any inner core station at any time of day?

Cost: \$8.9 billion

**\$12.6 billion, when adjusted for 2030 inflation*

Station Type

Inner Core Stations

All Other Stations

Typical Frequency¹

Every 15 min

Every 30 min peak

Every 60 min off peak

Inner Core stations are located in dense areas directly surrounding Boston, generally within Route 128.



¹In both directions

ALTERNATIVE 4

How do we make this happen?

- + **Invest \$3 billion in fleet expansion.** We'll add 336 diesel-powered multiple units (DMUs) and additional locomotives and coaches to our fleet so we can operate more frequently.
- + **Improve stations and tracks.** We'll add 24 miles of track and add platforms to 28 stations so we can offer equal service in both directions all day.
- + **Add 7 platforms at South Station.** Trains will be able to run more frequently to all south side lines all day.

Why is this good for riders?

With Alternative 4, more trains will come more often to stations in dense urban communities in the inner core.

This means riders will have more options, and we'll be able to accommodate the growth in ridership we expect and take additional drivers off the road. Our projections found:

North Side: A 67% ridership increase—30,800 more daily boardings vs. the “no-build” outlook

South Side: A 47% ridership increase—49,600 more daily boardings vs. the “no-build” outlook

Service Features

In addition to higher frequency, Alternative 4 imagines a more accessible, expansive Commuter Rail system.

Expansion - ➡

We'll add regular service to Foxboro, and extend the Middleborough Line to add service to New Bedford and Fall River through the [South Coast Rail project](#).

Accessibility ♿

We'll add full high-level boarding platforms at 19 stations for fewer barriers to access and quicker boarding time. All inner core stations will have full high-level boarding platforms.

No-Build Outlook

By 2040, even without service or infrastructure changes, we expect population and employment growth will expand ridership by 24,000.

With Rail Vision, we are looking to transform the existing system into one that better supports improved mobility and economic competitiveness in Greater Boston.

Alternative 5

What if you could catch an electrified
Commuter Rail train **every 15 minutes** at
any inner core station at any time of day?

Cost: \$10.6 billion*

*\$14.9 billion adjusted for
2030 inflation

Station Type

Inner Core Stations

All Other Stations

Typical Frequency¹

Every 15 min

Every 30 min peak

Every 60 min off peak

Inner Core stations are
located in dense areas
directly surrounding Boston,
generally within Route 128.



¹In both directions

ALTERNATIVE 5

How do we make this happen?

- + **Invest \$2.1 billion to expand our fleet.** We'll add 185 self-powered electric vehicles and more locomotives and coaches to our fleet so we can operate more frequently.
- + **Add 7 platforms at South Station.** Trains will be able to run more frequently to all south side lines all day.
- + **Improve stations and tracks.** We'll add 39 miles of track and add platforms to 34 stations so we can offer equal service in both directions all day.

Why is this good for riders?

With Alternative 5, more trains will come more often to stations in dense urban communities in the inner core.

This means riders will have more options, and we'll be able to accommodate the growth in ridership we expect and take additional drivers off the road. Our projections found:

North Side: A 67% ridership increase—30,900 more daily boardings vs. the “no-build” outlook

South Side: A 48% ridership increase—50,700 more daily boardings vs. the “no-build” outlook

Service Features

In addition to higher frequency, Alternative 5 imagines a more accessible, more expansive, partially electric Commuter Rail system.

Electrification ⚡

This alternative includes electrified service to all inner core stations and from Boston to Providence, Fall River, and New Bedford. Electric trains reduce emissions, improve air quality, and run like subway trains—speeding up and slowing down faster.

Accessibility ♿

We'll add full high-level boarding platforms at 19 stations for fewer barriers to access and quicker boarding time. All inner core stations will have full high-level boarding platforms.

No-Build Outlook

By 2040, even without service or infrastructure changes, we expect population and employment growth will expand ridership by 24,000.

With Rail Vision, we are looking to transform the existing system into one that better supports improved mobility and economic competitiveness in Greater Boston.

Expansion ➡

We'll add regular service to Foxboro, and extend the Stoughton Line south to connect more communities to Fall River and New Bedford through the [South Coast Rail project](#).

Shuttle service will connect North Station to a future West Station in Allston through the Kendal/MIT neighborhood.

Alternative 6

What if you could catch an electrified
Commuter Rail train at nearly any station
every 15 minutes at any time of day?

Cost: \$28.9 billion

**\$40.7 billion adjusted for
2030 inflation*

Station Type	Typical Frequency ¹
Inner Core Stations	Every 15 min
Key Stations	Every 15 min
All Other Stations	Every 15 min where possible



ALTERNATIVE 6

How do we make this happen?

- + **Invest \$6.5 billion to replace and expand our fleet.** We'll add 964 self-powered electric vehicles.
- + **Link North and South Stations.** We'll be able to run trains from one side to the other within the inner core.
- + **Improve stations and tracks.** We'll add 59 miles of track and add platforms to 32 stations so we can offer equal service in both directions all day.

Why is this good for riders?

With Alternative 6, more trains will come more often to nearly every station in our rail network. When we tested this alternative, we used a lower fare in the inner core to better understand demand for this service.

This means riders will have more options, and we'll be able to accommodate the growth in ridership we expect and take additional drivers off the road. Our projections found:

North Side: A 189% ridership increase—87,000 more daily boardings vs. the “no-build” outlook

South Side: A 133% ridership increase—138,900 more daily boardings vs. the “no-build” outlook

No-Build Outlook

By 2040, even without service or infrastructure changes, we expect population and employment growth will expand ridership by 24,000.

With Rail Vision, we are looking to transform the existing system into one that better supports improved mobility and economic competitiveness in Greater Boston.

Service Features

In addition to higher frequency, Alternative 6 imagines a more accessible, more expansive, fully electric Commuter Rail system.

Electrification ⚡

This alternative includes electrified service across our entire network. Electric trains reduce emissions, improve air quality, and run like subway trains—speeding up and slowing down faster.

Accessibility ♿

We'll add full high-level boarding platforms at 55 stations for fewer barriers to access and quicker boarding time. All stations will have full high-level boarding platforms.

Expansion ➡

We'll add regular service to Foxboro, and extend the Stoughton Line to connect more communities to Fall River and New Bedford through the [South Coast Rail project](#).

Shuttle service will connect North Station to a future West Station in Allston through the Kendall/MIT neighborhood.